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ABSTRACT

A 10-module computer-assisted instruction (CAI) program on study skills was field tested to determine its effectiveness with high school students, using 50 advanced seniors in a large Texas high school as subjects. The program consisted of a study skills pretest, the CAI modules, a notebook on study skills, and a posttest. The modules were programmed on a Commodore Pet microcomputer. Students in the experimental group were asked to complete one module per week during their free periods, while students in the control group were given a copy of the notebook and asked to go through the modules without the microcomputer. The module topics were time management, memory improvement, notetaking, textbook reading, examination taking, report writing, oral reporting, scholastic motivation, and interpersonal relations. Results indicate that the experimental group scored significantly higher than the control group on two of the subscales and on the total test. There were large differences among students in time spent on the CAI modules. The findings indicate that students who go through the CAI modules gain greater insights into effective study skills in the module's 10 focus areas and the use of the CAI in teaching study skills is supported. Suggestions for future research are included. (LMM)

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HIGH SCHOOL STUDENTS PARTICIPATE IN A CAI STUDY SKILLS PROGRAM[1,2]

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at the

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held at

Houston, Texas

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2. The author expresses sincere appreciation to Mrs. Carolyn Cartwright (teacher) and Mr. Bill Walters (principal) both from Greenville High School, Greenville, Texas for their time and effort in carrying out the study. Also, the author is most grateful to Mr. David Kurz, Research Assistant, for programming the modules on the computer, collecting, scoring, and recording the data.

ABSTRACT

The purpose of the study was to determine whether CAI study skills information would have significant effects on high school students' study habits as measured by a study skills test. Fifty high school students participated in the study of which 23 were in the experimental group and 27 were in the control group. All students responded to a pre- and post-test on study skills. The experimental group completed the CAI modules and notebook on study skills. Results of the analyses showed the experimental group scored significantly higher than the control group on two of the subscales and the total test.

Findings in numerous studies (2, 3, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21) have shown that instructions on effective study skills affect students' scholastic behavior, motivation and performance. Currently, the concern is how can the information on effective study skills be more readily disseminated to all students who need it and want it. Class discussion, group counseling and individual counseling have been utilized to impart the information on study skills. Of these methods, the individual counseling approach provides greater opportunities for students to become more actively involved in the learning process. But, the individual counseling approach is very time-consuming. In addition, in using the individual counseling approach it is difficult and expensive to provide well-designed programs to all students who want it. Educators and researchers have been trying to find alternative ways to effectively and efficiently present the information on study skills.

The computer-assisted instructions (CAI) approach has been successful in presenting various types of information. It was a belief that if good programs were written, the CAI approach could be used effectively to present the information on study skills. In addition, since many colleges and public schools are purchasing microcomputers for students' use, the information on study skills could be programmed on different microcomputers and made available to many students throughout the country and the world.

A CAI study skills program was developed and field-tested (10, 11, 14). With the results of the initial program, the CAI Study Skills Modules (13) were developed. Studies (9, 10, 11, 14), using the CAI study skills approach, show that students significantly gain insights on

specific study skills and the importance of developing such skills. These studies fully support the use of the computer-assisted instructions in teaching about study skills and study attitudes. Previous studies (9, 10, 11, 14), using the CAI study skills approach, were done with different groups of college students. Most of these college students, who participated in the CAI study skills program studies, wondered why they had not been offered the CAI study skills program previously and suggested that high school students be given the opportunity to go through the program.

The purpose of the present study was to determine whether study skills presented through computer-assisted instructions would significantly effect high school students' study habits as measured by a study skills test. It was hypothesized that students who complete the CAI Study Skills Modules (13), when compared to students who did not have access to the modules, would score significantly ($p < .05$ level) higher on the study skills test.

METHOD

Subjects

The subjects were 56 students enrolled in two advanced senior high school English classes in a large high school in Texas. Both classes were taught by the same teacher. Students were randomly assigned to the experimental and control groups. Over the period of the study (an academic year), six students withdrew from the study due to illness and/or withdrawal from school. Thus, the present study included 50 students of which 23 were in the experimental group and 27 were in the control group.

Program

The CAI study skills program, referred to in the present study, consisted of a pretest on study skills (5), the CAI Study Skills Modules (13) and an accompanying CAI Study Skills Notebook (6), and a posttest on study skills (5). The CAI Study Skills Modules (13) present information on how to develop ten study skills areas. The study skills discussed in the CAI Study Skills Modules (13) were areas adopted from the Student's Guides to Effective Study (4). The ten study skills areas discussed in the modules are the following.

1. Time Management modules presents information on how to effectively make use of the available time.
2. Memory Improvement module presents information on how to effectively improve one's remembering of studied materials.
3. Note Taking module presents information on how to effectively listen to lectures and take lecture notes.
4. Textbook Reading module presents information on how to effectively comprehend and retain what one has read.
5. Examination Taking module presents information on how to effectively prepare for and take different kinds of tests.
6. Report Writing module presents information on how to effectively write in-class themes and research reports.
7. Oral Reporting module presents information on how to effectively prepare and deliver speeches and oral reports.
8. Scholastic Motivation module presents information on how to effectively improve one's scholastic motivation.
9. Interperpersonal Relations module presents information on how to effectively improve one's interpersonal relationships.

10. Concentration Improvement module presents information on how to improve one's ability to concentrate on one's studies.

Each module ends with a quiz of ten multiple-choice items. The quiz is scored and students are given the results of the quiz. Depending on the score on the quiz, a suggestion is provided as to whether the student should go on to the next module or repeat the module just completed.

The CAI Study Skills Notebook (6) is systemically correlated with the the topics presented in the CAI Study Skills Modules (13). The notebook was designed to assist students make their notes on the content presented in the modules and have the information for future use.

Responses to the CAI Study Skills Test (5) can be done on the computer or with the test booklet on specific answer sheets. The test is a self-reporting instrument consisting of 200 true and false items. It was designed to indicate the respondent's knowledge about the ten areas of study skills presented in the CAI Study Skills Modules (13). Some of the items in the CAI Study Skills Test (5) were adopted from the Effective Study Test (1) which is correlated with the Student's Guides to Effective Study (4). The CAI Study Skills Test (5) has ten scales measuring the ten areas presented in the CAI Study Skills Modules (13). There are 20 items in the test measuring the content areas of each of the ten modules. The total overall (Study Effectiveness scale) score is obtained by adding the responses to the 200 items. Scores on each scale and the total test are converted to percentages and the percentages are plotted on the profile found at the back of the answer sheet.

Procedure

A large high school in Texas was selected to carry out the study. The CAI Study Skills Modules (13) were programmed on a Commodore Pet

microcomputer and several copies of the diskettes were made available. The selected high school had four Commodore Pet microcomputer terminals set up in a small room for students' use. This high school had other CAI programs in math, chemistry, etc. which students have been doing for several years. However, the school did not have a CAI study skills program. It was agreed among the principal, teacher and students that the students would do the CAI study skills program during one of their free periods. Consent forms were obtained from the parents to have their sons and daughters participate in the study. To ensure students' rights and obtain their cooperation, students signed a research release form.

At the beginning of the fall semester, 56 students responded to the paper and pencil pretest on study skills during a class period. Then, the students were randomly assigned to the experimental and control groups. The subjects in the experimental group were given a copy of the CAI Study Skills Notebook (6) and asked to complete one module per week. In going through the modules, students were asked to: indicate the time they began each module and the time they completed it, answer all questions in their notebook, and record in their notebook the score they obtained on each module quiz. When the students in the experimental group completed the ten modules, all students (experimental and control groups) responded to the paper and pencil posttest on study skills during a class period.

In order to provide an opportunity for all students who agreed to participate in the study to go through the CAI Study Skills Modules (13), after the administration of the posttest, the students in the control group were given a copy of the notebook and asked to go through the modules. The scores for all study skills scales on the pre- and posttests

were plotted on the profiles for each student. Each student received his/her profile and an interpretation of the scores. To determine whether the pre- and posttest scores on all scales and overall test differed significantly for the experimental and control groups, the data were analyzed using the analysis of covariance.

RESULTS

The means and standard deviations for the pre- and posttests of all scales and total study skills test for the two groups are presented in Table 1. Since there were 20 items in the test measuring the contents in

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Insert Table 1 here

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each module, a score of 20 was the highest possible score a student could obtain on each of the ten scales. The mean scores (Table 1) on most of the ten scales on the pretest, for the experimental and control groups, were fairly high. For instance, an average score of 16 on a scale means that the group answered (16 x 5) 80 percent of the items correctly. In further examining the data in Table 1, one finds that the experimental group earned (numerically) a higher score on the posttest than on the pretest on all scales except one, Textbook Reading Scale. Whereas, for the control group, the posttest scores were (numerically) lower than their pretest scores on five of the eight scales and the total (overall) score. This trend of responding to pre- and posttests on study skills by experimental and control groups was similar to those reported in previous studies (10, 11, 12, 14, 15, 16). The reason for this pattern of responding to a test could be that the subjects in the experimental group gained insights on effective study skills and scored higher on the posttest. Whereas, subjects in the

control group (not having access to the information on effective study skills) were either unsure of their study skills or felt that their study skills were not as effective as they originally perceived them to be. Being unsure of themselves, they tended to guess on the items and, in so doing, scored lower on the posttest.

To determine if the scores on the posttests were significantly higher for the experimental group, analyses of covariance were computed for each of the ten scales and the (overall) total test. The results of the analyses are presented in Table 2. The data (Table 2) show that the F -

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Insert Table 2 here

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ratios were statistically significant on Memory Improvement ($p < .05$ level) and the Interpersonal Relations ($p < .02$ level) scales. Also, and most importantly, the F - ratio for the total test, the Study Effectiveness scale, was statistically significant ($p < .02$ level). Based on the finding of the total test which consists of 200 items, it could be stated that the experimental group gained significant insights on the ten areas of the study skills by going through the CAI Study Skills Modules (13). The results in the present study concur with those reported in previous studies (10, 11, 14, 15), in that, students who received instructions on study skills using the CAI approach gained significant insights on the ten areas of study skills presented in the modules.

Students were asked to record the time they began each module and the time they completed it. The information was later checked with the computer printout. The data (means and standard deviations) on time spent on the computer terminals are presented in Table 3. Some modules require

Insert Table 3 here

more writing in the notebook and, therefore, took longer to complete; e.g. Report Writing module took an average of 48.5 minutes. Other modules which require more reading took less time, e.g. an average of 25.8 minutes was spent on Concentration Improvement modules and 26.9 minutes on Textbook Reading module. The average time spent on a module was 34.4 minutes. Thus, the total time spent on all the CAI modules was 344.2 minutes or 5.73 hours.

In examining the standard deviations (Table 3) on time spent on the computer terminals on each module, one finds a wide variation among the students. This information indicates that even though students were advanced seniors, there were vast differences among them as to the amount of time they spent on the computer terminals doing the modules.

CONCLUSION

The findings in the present study concur with findings reported in previous studies (10, 11, 14, 15), in that, students who go through the CAI Study Skills Modules (13) gain greater insights on effective study skills in the ten areas presented in the modules. The findings further support the use of the CAI in the teaching study skills.

In the present study, advanced senior high school students served as subjects. Most of these students had fairly good study skills. It is suggested that in future studies using the CAI Study Skills Modules (13), high school students with average and below average abilities should be included. In addition, other information on students' characteristics, such as, their self-concepts and academic performance would be highly

desirable. With these types of data, it might be possible to determine which students need and would profit most from the CAI study skills program.

In the present study, there were 50 high school students who completed the program. It is suggested that other investigations be made with larger numbers of high school students and the data on these studies be carefully collected, analyzed, and disseminated. With a larger number of subjects, the differences on the various scales of the test might be more apparent.

Previous studies have shown that students who had instructions on study skills changed in their scholastic behavior, motivation and academic performance. The present investigation was concerned with how to most effectively and efficiently disseminate the information on specific basic study skills. If students are to develop self-confidence and positive attitudes towards studying and improve their academic performance, they need to have the knowledge of effective study skills and develop such skills.

Table 1

Means and Standard Deviations for Pre- and Posttests for All Scales of the CAI Study Skills Test for Experimental (N = 23) and Control (N = 27) High School Groups

Scale	Group	Test			
		Pretest		Posttest	
		M	SD	M	SD
Time Management	Experimental	16.65	1.64	17.52	1.34
	Control	16.26	1.87	17.04	1.26
Memory Improvement	Experimental	17.74	1.51	18.04	1.11
	Control	17.56	1.25	17.07	1.64
Note Taking	Experimental	16.65	1.47	16.74	1.76
	Control	16.82	2.37	16.30	1.75
Textbook Reading	Experimental	17.57	1.31	17.52	1.34
	Control	16.70	1.64	16.56	1.55
Examination Taking	Experimental	16.91	1.31	17.91	1.16
	Control	16.78	1.48	17.37	2.20
Report Writing	Experimental	17.44	2.25	17.52	2.21
	Control	17.22	1.87	17.04	3.02
Oral Reporting	Experimental	14.74	1.91	16.39	1.80
	Control	15.70	2.11	15.59	4.05
Scholastic Motivation	Experimental	17.48	1.62	17.91	1.88
	Control	17.70	1.52	17.59	3.20
Interpersonal Relations	Experimental	13.74	1.89	15.52	2.37
	Control	14.85	2.13	14.37	2.66
Concentration Improvement	Experimental	15.48	2.41	17.26	2.16
	Control	16.15	2.77	16.26	3.02
Study Effectiveness (Total)	Experimental	164.39	9.61	172.39	9.57
	Control	165.48	10.48	164.82	17.58

Table 2

Analyses of Covariance on Pre- and Posttests for All Scales of the CAI Study Skills Test for High School Students (Experimental Group, N = 23 and Control Group, N = 27)

Scale	Source	Sum of Squares	df	Mean Squares	F-ratio
Time Management	Treatment	1.849	1	1.849	1.213
	Error (within groups)	71.642	47	1.524	
Memory Improvement	Treatment	11.276	1	11.276	5.506*
	Error (within groups)	96.247	47	2.048	
Note Taking	Treatment	3.084	1	3.084	1.157
	Error (within groups)	125.258	47	2.665	
Textbook Reading	Treatment	5.667	1	5.667	2.881
	Error (within groups)	92.462	47	1.967	
Examination Taking	Treatment	2.552	1	2.552	1.040
	Error (within groups)	115.379	47	2.455	
Report Writing	Treatment	1.416	1	1.416	0.268
	Error (within groups)	248.431	47	5.286	
Oral Reporting	Treatment	20.762	1	20.762	2.226
	Error (within groups)	439.406	47	9.328	
Scholastic Motivation	Treatment	3.141	1	3.141	0.554
	Error (within groups)	266.317	47	5.666	
Interpersonal Relations	Treatment	36.016	1	36.016	6.831**
	Error (within groups)	247.799	47	5.272	
Concentration Improvement	Treatment	19.571	1	19.571	3.186
	Error (within groups)	288.677	47	6.142	
Study Effectiveness (Total)	Treatment	896.065	1	896.065	6.483**
	Error (within groups)	6496.578	47	132.225	

*$p < .05$

**$p < .02$

Table 3

Means and Standard Deviations for Time (in Minutes) Spent on the CAI Study Skills Modules by High School Students (N = 23)

Module	M	S.D.
Time Management	36.591	7.281
Memory Improvement	36.091	7.940
Note Taking	28.545	7.539
Textbook Reading	26.909	6.625
Examination Taking	37.545	9.758
Report Writing	48.545	16.285
Oral Reporting	38.955	10.233
Scholastic Motivation	32.545	10.676
Interpersonal Relations	32.682	9.172
Concentration Improvement	25.818	9.267
Study Effectiveness (Total)	344.227	63.844
Average (Total)	34.423	6.384

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